Science & Technical Support Section's
SciFYI
King County
Department of Natural Resources and Parks
Water and Land Resources Division
A science section digest of current environmental issues in King County
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Fecal bacteria levels in regional waters – are we making progress?

by Tim Clark

King County scientists recently published Fecal Bacteria in King County Waters: Current Conditions, Long-term Trends, and Landscape Factors, a report that summarized fecal contamination in King County surface waters and assessed the landscape for conditions associated with observed contamination.

Bacterial contamination of Puget Sound, lakes, rivers, and streams is a widespread problem throughout King County.

As of 2019, Washington State Department of Ecology's Water Quality Assessment lists nearly 200 waterbodies in King County as impaired by unhealthy levels of bacteria in the water and a pollution control plan is in place for only about one-third of them. This threatens public and environmental health.

Many commercial and recreational shellfish harvest areas in King County have been closed by bacterial contamination in 2019:

- There are 9,612 acres of commercial shellfish growing areas in King County and about half are open for year-round harvest. The remainder are closed or not monitored. Growing areas remain closed until sufficiently low pollution levels are seen. Additionally, a 124-acre area in Poverty Bay (near Federal Way) is closed from June 1 to November 30 due to seasonal fecal contamination concerns.
- Of the 37 public Puget Sound beaches in King County, over half are closed to shellfish harvest due to fecal contamination.

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Fecal waste from livestock, wildlife, pets, and humans can pollute surface waters if not properly managed. Many of King County's surface waters suffer from fecal pollution.

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12,112 people were experiencing homelessness in King County, as noted during the annual one-night count across the county in 2018. Over half were unsheltered.

In addition to unsafe living conditions, persons that lack access to sanitary facilities, such as those living in encampments and recreation vehicles, can spread disease and contaminate nearby waterbodies.

Monitoring by King County confirmed that bacterial levels in surface waters are affected by on-site sewage systems (septic systems), runoff from developed areas, and areas with small farms and livestock.

Our analysis linked surface water bacteria levels to land use and environmental factors. Monitoring locations in a watershed with higher numbers of on-site sewage systems, population and/or agricultural land uses, tended to have higher levels of fecal bacteria.

The good news: bacteria levels in surface waters have decreased at most monitoring locations since the 1970s.

The results from our study indicated that bacteria levels have significantly decreased at the majority of long-term freshwater monitoring sites. We also observed a significant decrease in bacteria levels at several marine sites. Results also indicated bacteria levels were only decreasing at a few of the State Department of Health shellfish sites. Even so, none had increasing bacteria levels. We did not attempt to statistically assess the factors contributing to the decreased levels of bacteria in surface waters, but we think that several factors may be driving the decreasing regional trends. Specifically, we suspect the following actions are reducing fecal inputs:

- More effective stormwater management by public agencies and the private sector.
- Connecting septic systems to sewer lines where available or updating aging systems.
- Decreasing agricultural land cover (resulting in less livestock waste generation and land application of manure) and improved manure management at existing farms.
- Increased resident awareness and environmental stewardship leading to such things as better pet waste management, for example.

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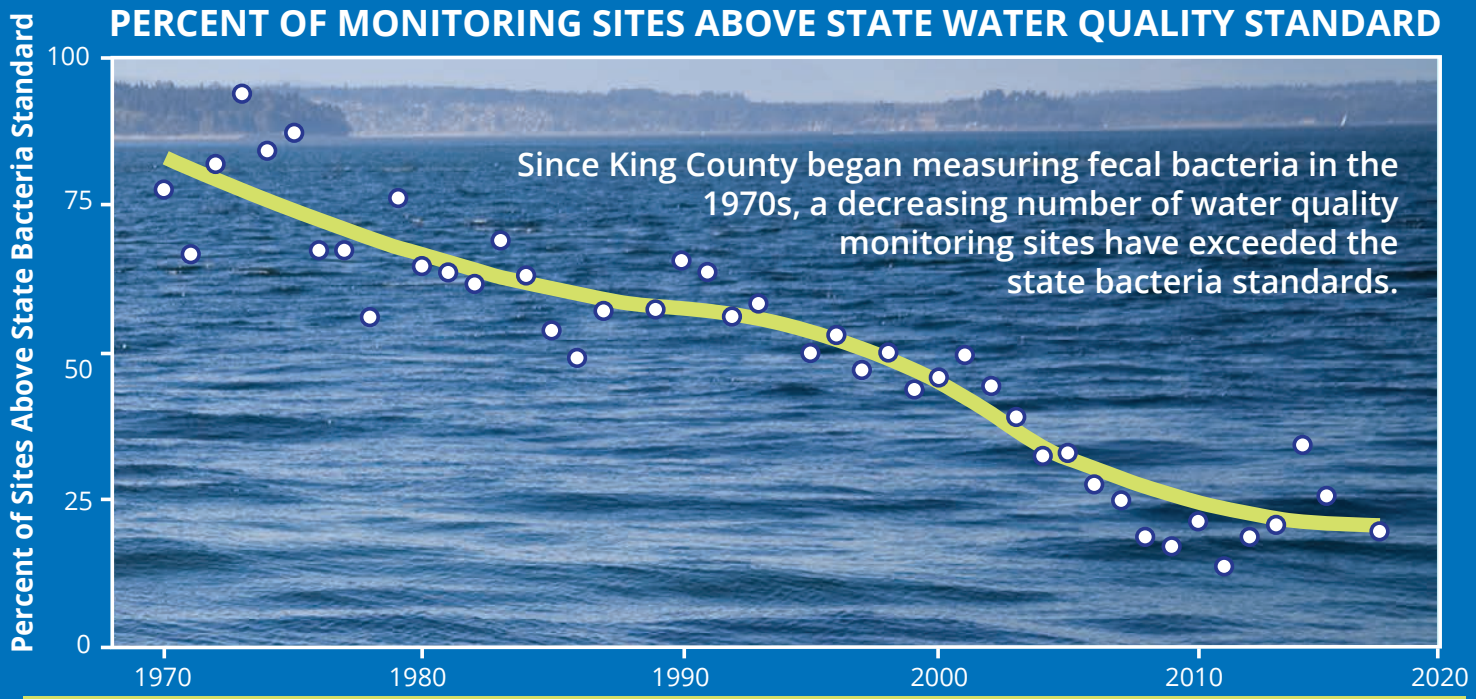

King County and local cities have programs that aim to reduce fecal contamination of surface waters.

King County has reduced bacteria entering surface waters by:

- **Controlling combined sewer overflows** by curbing the frequency and volume of discharge during rainy weather;
- **Partnering with the King Conservation District and property owners to implement farm and manure management plans** (e.g. keeping cattle out of waterbodies);
- **Finding and stopping unlawful discharges to the stormwater system or surface waters;**
- **Outreach and education for residents about water pollution and how to prevent it** (e.g., pick up pet waste, inspect and maintain on-site septic systems); and
- **Requiring point-of-sale septic system inspections for property transfers.**

To ensure that shellfish harvested from King County beaches are safe to eat and swimmers are protected from disease, further fecal pollution controls are likely to be needed.

Bacteria levels in King County surface waters have greatly declined over the past 50 years presumably owing to the success of programs listed above. However, the amount of fecal material in our surface waters continues to threaten public and environmental health. To successfully address remaining fecal contamination, we recommend continued implementation, or the expansion, of existing programs that address:

(1) on-site sewage systems (e.g., proper operation and maintenance, and repairing failures);

(2) problems in built environments (e.g., stormwater treatment, pet waste management, wildlife control, sanitary facilities for homeless people); and

(3) agriculture (e.g., livestock/manure management plans). ■

What are fecal indicator bacteria?

Fecal indicator bacteria are used to assess the microbiological quality of water because, although not typically disease-causing, they are correlated with the presence of several waterborne disease-causing organisms. The concentration of indicator bacteria is a measure of safety for body-contact water recreation or for water consumption.

Human health risks may be assessed using concentrations of specific bacteria genera and species (i.e., Enterococcus spp. or E. coli) or certain bacteria groups (i.e., fecal coliform and streptococci bacteria). Fecal coliforms have been the primary indicator until relatively recently when the U.S. Environmental Protection Agency began recommending Enterococcus or E. coli as better indicators of health risk. Washington State is currently transitioning from fecal coliform to Enterococcus or E. coli water quality criteria. Shellfish bed monitoring will continue to use fecal coliform.

About King County's SCIFYI

King County
Department of Natural Resources and Parks
Water and Land Resources Division
Science and Technical Support Section

Clean Water
Healthy Habitat

Section Manager: Dave White

Newsletter Coordinator: Chris Knutson

Designer: Laurel Preston

Web Design/Production: Fred Bentler

Send questions, comments and future story ideas to:

- Debra Bouchard – debra.bouchard@kingcounty.gov, 206-477-4650
- Kate O'Laughlin – kate.olaughlin@kingcounty.gov, 206-477-4789
- Deb Lester – deborah.lester@kingcounty.gov, 206-477-4752

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